



Fluorescent Lamp Ballasts

Hazardous Waste Program and Environmental Assistance Office technical bulletin

12/2002

The primary concern regarding the disposal of used fluorescent lamp ballasts is the health risk associated with polychlorinated biphenyls (PCBs). Human exposure to these possible carcinogens can cause skin, liver and reproductive disorders. Fluorescent and high-intensity discharge (HID) lamp ballasts contain a small capacitor that may hold high concentrations of PCBs (greater than 90 percent pure PCBs or 900,000 parts per million). The chemical compounds were widely used as insulators in electrical equipment such as capacitors, transformers, switches, and voltage regulators through the late 1970s. The Toxic Substances Control Act (TSCA) was enacted in 1976, and subsequently banned the production of PCBs in the United States.

The proper method for disposing of used ballasts depends on several factors, such as the type and condition of the ballasts and the regulations and recommendations in effect. TSCA specifies the disposal method for ballasts that are leaking PCBs. In addition, generators of PCB-containing ballast wastes may be subject to notification and liability provisions under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) – also known as "Superfund". (Note: PCBs are not regulated as hazardous waste; however, there may be other components in the ballast that would cause it to test out as a hazardous waste. Hazardous waste is not covered in this technical bulletin. Additional regulations will need to be met if the ballast contains hazardous waste.)

Small Capacitors in Fluorescent Light Ballasts and Cause for Failure

Light ballasts are the primary electric components of fluorescent light fixtures and are generally located within the fixture under a metal cover plate. The ballast units are generally composed of a transformer to reduce the incoming voltage, a small capacitor (which may contain PCBs) and possibly a thermal cut-off switch or safety fuse. These components are surrounded by a tarlike substance that is designed to muffle the noise that is inherent in the operation of the ballast. When a ballast unit fails, excessive heat can be generated, which will melt or burn the tar material, creating a characteristic foul odor.

In considering causes of ballast failure, some privately conducted tests have indicated that operation of power saving lamps with a standard ballast or standard lamps with a power-saving ballast tends to significantly increase the ballast operating temperature and decrease its normal life span. It appears that ballasts will fail less frequently if standard lamps are used only with standard ballasts and power-saving lamps with power-saving ballasts. Fluorescent lamps should be changed in pairs: new lamps should not be used with old lamps.

When upgrading lighting, make sure your contractor removes all disconnected PCB-containing ballasts from the light fixtures. Non-leaking PCB-containing ballasts may still pose a hazard if left in upgraded fixtures, especially in the case of fire.

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Identifying PCB Ballasts

Use the following guidelines to identify ballasts that contain PCBs:

- All ballasts manufactured through 1979 contain PCBs.
- Ballasts manufactured after 1979 that do not contain PCBs are labeled "No PCBs."
- If the ballast is not labeled "No PCBs", *assume* it contains PCBs.

Contains
PCBs
Manufactured
through 1979



Probably does not
contain PCBs
Manufactured
after 1979

It is extremely important to find out if a ballast containing PCBs is leaking *before you remove it from the fixture*, so that you can handle it properly.

Recommendations for Handling Leaking PCB Ballasts

EPA recommends the following for anyone with a fluorescent light ballast leaking PCBs:

1. Vacate the room or area immediately and open any windows to ventilate the room to the outside.
2. Turn off the light fixture at the switch and disconnect electricity at the fuse or breaker box. Let the ballast cool for 20 to 30 minutes before proceeding.

If the room is fully ventilated, the amount of PCB contaminated particulate matter in the air should decrease significantly enough to make it negligible and decrease the risk of inhalation exposure. If the incident occurred in a room that cannot be vented, the person replacing the failed ballast and cleaning up can reduce exposure by wearing a chemical cartridge respirator equipped with an organic vapor cartridge.

3. Wear rubber gloves that will not absorb PCBs (e.g. neoprene, butyl, or nitrile). Further, if you will be working directly under the fixture, consider using additional protective gear such as goggles (or a face shield) and rubber apron to help guard against possible exposure from leaking or cleanup activities. Exercise caution to avoid personal contamination (e.g. from touching your face with a contaminated glove).

During the cleanup or removal period, smoking should be prohibited in the area because smoking increases the inhalation rate of contaminated air. In addition, you may be using a flammable solvent in the cleanup.

4. Remove the fluorescent lamp.
5. Recheck that the power is off at the fuse or breaker box. Remove the metal cover over the wiring and ballast unit, loosen the ballast unit by taking out the metal screws that hold it to the end of the fixture; cut the electrical wires going to the ballast and remove the ballast. Note: Wire connectors can be used when installing the new ballast.
6. Proceed to clean up leaks using the following guidelines:
PCBs that leak onto nonabsorbent surfaces such as table tops and uncarpeted floors should first be cleaned up by wiping with a rag or paper towel or by scraping with a putty knife, if hardened. Avoid smearing the PCBs around. This would only contaminate a larger area. Surfaces should then be thoroughly cleaned twice using an appropriate solvent or detergent. Only certain solvents are effective in cleaning up spilled PCBs. These include mineral spirits, deodorized kerosene, turpentine and rubbing alcohol. Certain detergents containing trisodium phosphate (such as Soilex or Spic 'n Span) may be used. However, they should be

used only at full strength and applied with a damp rag rather than diluted in a bucket. Other effective products may also be available. That solution would become contaminated and can only be disposed into the sanitary sewer system with the permission of the local publicly operated wastewater treatment works. (No disposal into storm drains or septic tank systems is allowed.) If the treatment facility will not approve the onsite discharge to the sanitary sewer, the contaminated water must be placed in an appropriate container and characterized for proper disposal.

For leaks onto absorbent material such as drapes and carpets, there is no reliable way to clean and decontaminate the material. In the case of rugs and fabrics, the material should be cut away in a six-inch radius around the contaminated point(s). In areas where foot traffic has spread contamination, the entire carpet should be disposed of. Proper disposal procedures for all such materials are described in the following section. Associated surfaces, such as flooring under contaminated carpeting, should be thoroughly cleaned with a solvent or detergent as previously described.

(One might consider discarding the entire light fixture instead of decontaminating the unit. This would eliminate the chance of skin coming into direct contact with the PCBs while cleaning the inside of the light fixture.)

7. Contaminated materials (ballasts, rags, clothing, gloves, drapes, carpets, etc.) should be packed into crumpled newspapers or other absorbent materials (sawdust, kitty litter, vermiculite, soil, etc.) and placed in a double thickness plastic bag. It will then be packed in 55-gallon drums for transportation according to PCB regulations. (See the section on Packing PCB Ballasts for Disposal.)

When you are completely through with the cleanup process, and contaminated materials and protective clothing have been packed for disposal, you should wash your hands thoroughly with detergent. Continue to ventilate the room for 24 hours before reuse.

Disposal of Leaking and Non-Leaking PCB Ballasts (and contaminated materials)

A puncture or other damage to a ballast in a lighting system exposes an oily tar-like substance. If this substance contains PCBs, the ballast and all materials it contacts are considered PCB waste, and are subject to TSCA requirements. Use trained personnel or contractors to handle and dispose of leaking PCB-containing ballasts.

Arrangements must be made with a facility for the pick-up, manifesting and shipment of ballasts, PCB-soiled items, or fluorescent fixtures containing PCBs, to an approved chemical waste-processing site. These firms will also perform minor PCB spill cleanups and arrange for the removal of PCB capacitors. (See Commercial Hazardous Waste and PCB Facilities Located in Missouri, List, PUB968.) **Leaking PCB-containing ballasts must be incinerated in an approved high-temperature incinerator.**

Non-leaking small PCB capacitors (lighting ballasts) are not required to be incinerated. There are several options for disposal of non-leaking ballasts.

- High Temperature Incineration – This disposal method is the one preferred by many companies because it *destroys PCBs, removing them from the waste stream permanently, and removing the potential for future CERCLA liability.* Incinerating PCB-containing ballasts costs more than sending them to a hazardous waste landfill or a sanitary landfill, but this additional cost is one many organizations are willing to absorb to limit future liability.

- **Recycling Ballasts** – You may recycle used non-leaking ballasts despite PCBs. Recyclers remove the PCB-containing materials (i.e., the capacitor and possibly the asphalt potting material surrounding the capacitor) for incineration or land disposal. Metals, such as copper and steel, can be reclaimed from the ballasts for use in manufacturing other products. (See Fluorescent Bulb Recyclers, List, PUB451, for some fluorescent bulb recyclers that also accept ballasts.) Missouri does not require the use of a hazardous waste manifest or a hazardous waste transporter when shipping non-leaking PCB ballasts for recycling. If you are shipping ballasts to out-of-state recyclers, you should contact the environmental agency of the receiving state. The receiving state may require use of licensed hazardous waste transporters and/or hazardous waste manifests for shipments to a recycler, even though Missouri does not.
- **Chemical or Hazardous Waste Landfill** – PCB-containing ballasts may also be disposed in a chemical or hazardous waste landfill. Chemical or hazardous waste landfill disposal is less expensive than high-temperature incineration or recycling, but does not eliminate PCBs from the waste stream permanently. While chemical or hazardous waste landfill disposal is an acceptable, regulated disposal method, your organization may be legitimately concerned about potential CERCLA liability using this method.
- **Sanitary Landfill** – Non-leaking PCB-containing ballasts may be disposed of in a sanitary landfill. While this type of disposal is allowed, there is a high potential of CERCLA liability using this method.

Note: CERCLA regulates the disposal of non-leaking PCB-containing ballasts. CERCLA requires building owners and generators to notify the National Response Center at 1-800-424-8802 when disposing of a pound or more of PCBs (roughly equivalent to 10-12 fluorescent ballasts) in a 24-hour period. As a generator of PCB-containing ballast wastes, you could be liable in any subsequent Superfund cleanup at a municipal, hazardous, or chemical disposal site, incinerator, or recycling facility. Your contractor should provide you with documents verifying the disposal method.

Packing PCB Ballasts for Disposal

Despite the disposal method selected, ballasts are packed, according to PCB regulations, in 55-gallon drums for transportation.

- One drum holds 150 to 300 ballasts depending on how tightly the ballasts are packed.
- Fill void space with an absorbent packing material (sawdust, kitty litter, vermiculite, soil, etc.) for safety reasons.
- Label drums according to TSCA and Department of Transportation regulations.
- Note that tightly packed drums may weigh more than 1,000 pounds, which may present a safety risk, particularly when moving the drum for loading or unloading.

Transportation

Transporters of leaking PCB ballasts and PCB-contaminated waste need to be licensed hazardous waste transporters. Missouri does not require the use of a hazardous waste manifest or a hazardous waste transporter when shipping non-leaking PCB ballasts for recycling. Other states may have additional transportation requirements for non-leaking PCB ballasts, leaking PCB ballasts, and PCB-contaminated waste.

Record Keeping

To track transported TSCA or hazardous waste (leaking PCB ballasts and PCB-contaminated waste), generators must prepare a hazardous waste manifest. The manifest identifies the type and quantity of waste, the generator, the transporter and its ultimate destination. Please contact the Missouri Department of Natural Resources' Communication and Education Office for blank copies of manifests.

The manifest must accompany the waste wherever it travels. Each handler of the waste must sign the manifest and keep one copy. When the waste reaches its destination, the owner of that facility returns a copy of the manifest to the generator to confirm that the waste arrived. If the waste does not arrive as scheduled, generators must immediately notify the Missouri Department of Natural Resources' Hazardous Waste Program, so that they can investigate and act appropriately. Copies of the completed manifests should be kept for at least three years.

How may I obtain copies of hazardous waste laws and regulations?

Copies of the Revised Statutes of Missouri are available through the Reviser of Statutes at (573) 526-1288, and are available online at www.moga.state.mo.us. Copies of the Missouri Code of State Regulations are available through the Missouri Secretary of State at (573) 751-4015, and are available online at www.mosl.sos.state.mo.us. Federal regulations may be viewed at federal depository libraries or may be purchased from a U.S. Government Bookstore, the U.S. Government Printing Office, or from a commercial information service such as the Bureau of National Affairs. Federal Regulations are also available online at www.access.gpo.gov/nara/cfr/index.html.

For More Information:

For more information on Fluorescent Lamp Ballasts, please contact:

Missouri Department of Natural Resources

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(www.dnr.state.mo.us/oac/env_assistance.htm) EAO Internet Home Page

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